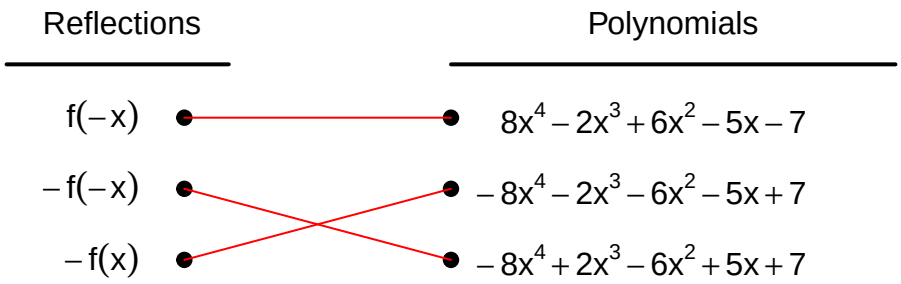
Name: Date:

Exam: Function Reflections (Solution version 603)

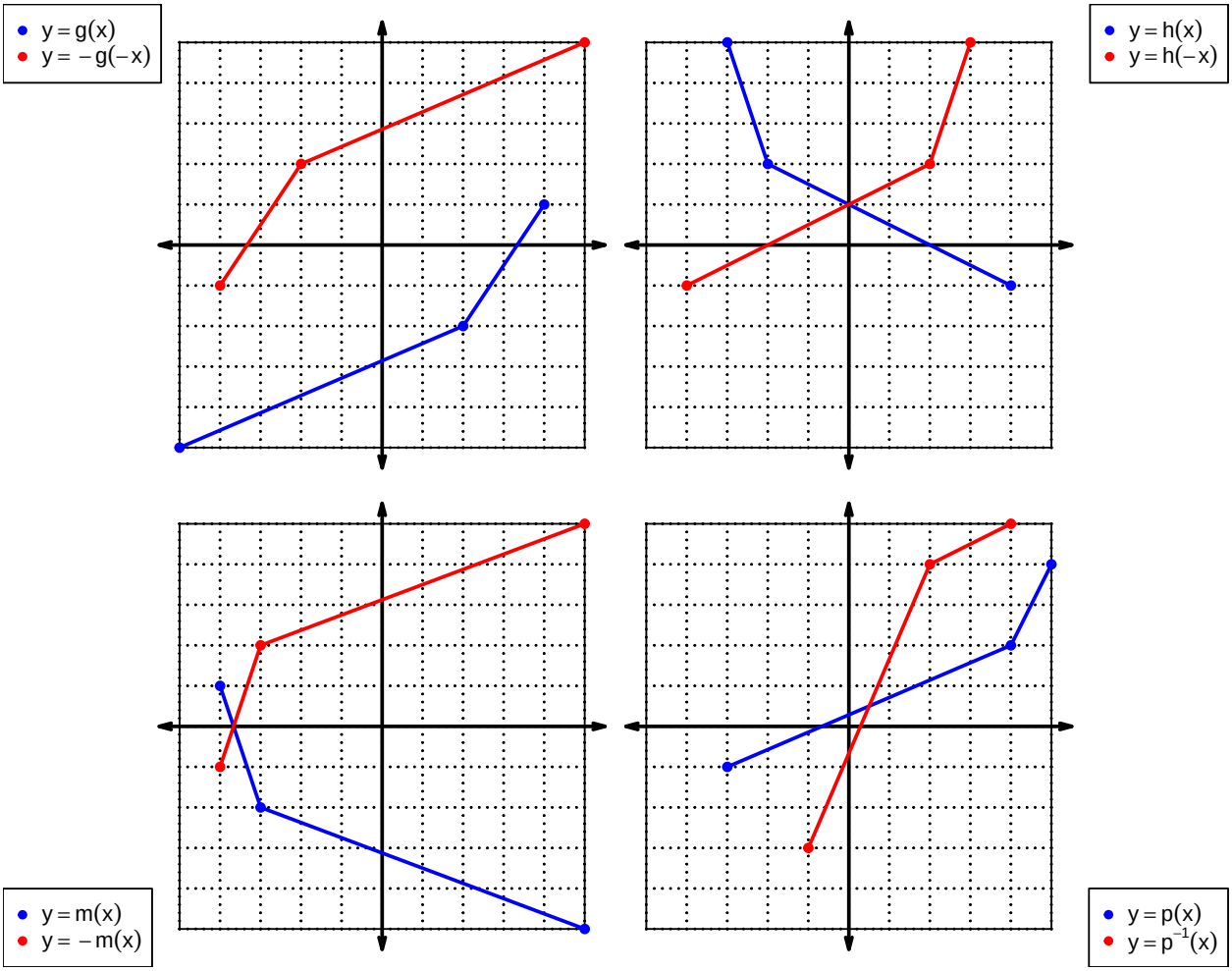
1. (worth 9 points) Let function f be defined by the polynomial below:

$$f(x) = 8x^4 + 2x^3 + 6x^2 + 5x - 7$$

Draw lines that match each function reflection with its polynomial:



2. (worth 20 points) In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



Exam: Function Reflections (Solution version 603)

For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	6	9	2
2	7	3	5
3	1	8	9
4	9	7	8
5	3	1	4
6	2	4	3
7	4	5	1
8	5	2	7
9	8	6	6

3. (worth 3 points) Evaluate $h(5)$.

$$h(5) = 4$$

4. (worth 3 points) Evaluate $g^{-1}(9)$.

$$g^{-1}(9) = 1$$

5. (worth 3 points) Assuming g is an **even** function, evaluate $g(-7)$.

If function g is even, then

$$g(-7) = 5$$

6. (worth 3 points) Assuming f is an **odd** function, evaluate $f(-6)$.

If function f is odd, then

$$f(-6) = -2$$

Exam: Function Reflections (Solution version 603)

7. (worth 15 points) A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
Let polynomial p be defined with the following equation:

$$p(x) = -x^2 - x$$

a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^2 - (-x)$$
$$p(-x) = -x^2 + x$$

b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -\left(-x^2 + x\right)$$
$$-p(-x) = x^2 - x$$

c. Is polynomial p even, odd, or neither?

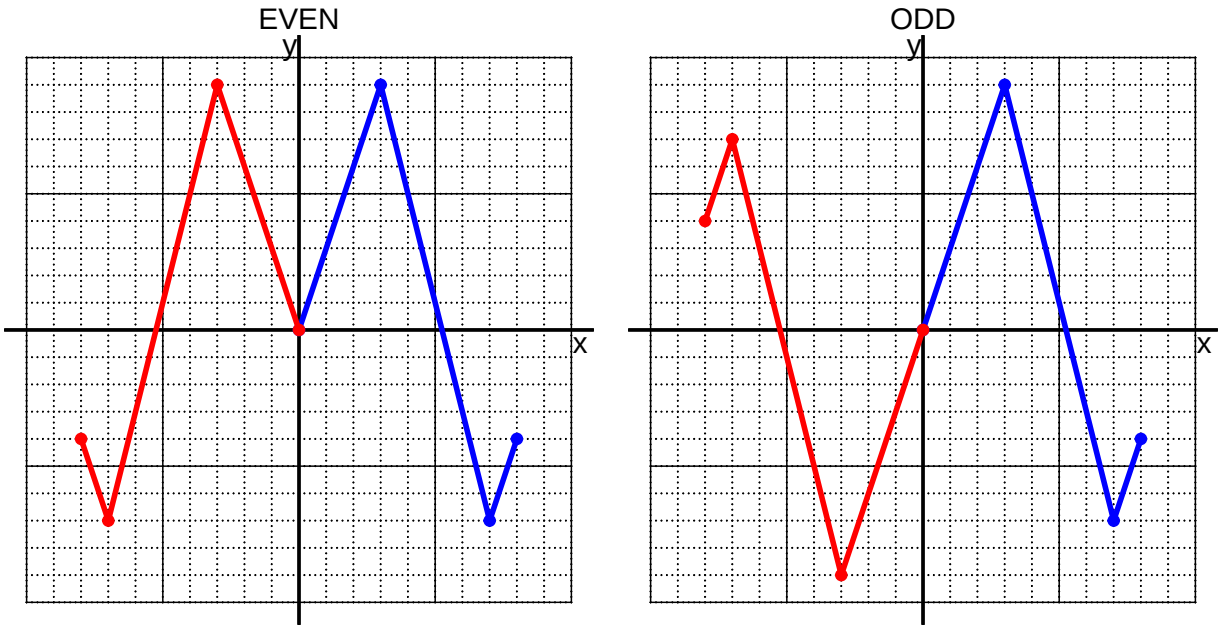
neither

d. Explain how you know the answer to part c.

We see that $p(x)$ is not equivalent to either $p(-x)$ or $-p(-x)$, so p is neither even nor odd.

Exam: Function Reflections (Solution version 603)

8. (worth 10 points) I have drawn half of a function. Draw the other half to make it even or odd.



9. (worth 10 points) Let function f be defined with the equation below.

$$f(x) = 8(x+3)$$

a. Evaluate $f(4)$.

step 1: add 3
step 2: multiply by 8

$$f(4) = 8((4)+3)$$
$$f(4) = 56$$

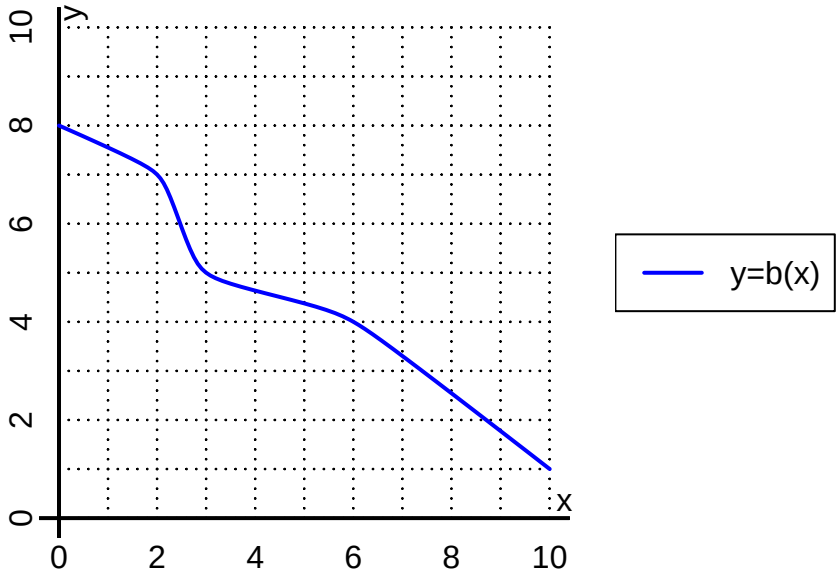
b. Evaluate $f^{-1}(72)$.

step 1: divide by 8
step 2: subtract 3

$$f^{-1}(x) = \frac{x}{8} - 3$$
$$f^{-1}(72) = \frac{(72)}{8} - 3$$
$$f^{-1}(72) = 6$$

Exam: Function Reflections (Solution version 603)

10. (worth 6 points) The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(3)$.

$b(3) = 5$

b. Evaluate $b^{-1}(4)$.

$b^{-1}(4) = 6$

Exam: Function Reflections (Solution version 603)

11. (worth 18 points) Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-6	6	6	-6
-1	9	-9	-9	9
0	0	0	0	0
1	-9	9	9	-9
2	6	-6	-6	6

b. Is function f even, odd, or neither?

odd

c. How do you know the answer to part b?

Function f is odd because column $-f(-x)$ matches column $f(x)$ exactly.